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DIGITALIZATION OF PUBLIC FINANCE FOR ENHANCING STATE TRANSPARENCY AND ACCOUNTABILITY

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Abstract. The article is devoted to the study of digitalization of public finance as a key factor in enhancing transparency and government accountability. It analyzes the theoretical and methodological foundations of the digital transformation of the budgetary process and identifies the institutional and technological architecture of digital finance, which includes government information systems, open data repositories, and analytical platforms. The practical effects of digitalization are examined, including increased accessibility of financial data, standardized reporting, analytical control, and public participation in the budgetary process. The study identifies problems and risks associated with the implementation of digital platforms, such as system fragmentation, cybersecurity threats, regulatory constraints, and low digital literacy among users. Recommendations are proposed for improving digital infrastructure, the regulatory framework, cybersecurity, analytical monitoring, and public oversight. The results indicate that digitalization of public finance contributes to the formation of a transparent, accountable, and efficient system for managing state resources, enhances public trust, and ensures the strategic resilience of public finances.

Key words: digitalization, public finance, public financial transparency, government accountability, E-Government, Open Data, public finance analytics, public oversight, E-Budgeting.

Introduction.

The modern transformation of the public finance system is unfolding within the context of a global digital revolution that fundamentally reshapes the methods of formation, distribution, and control of state resources. The digitalization of the financial sphere has become one of the most powerful drivers of enhanced efficiency in public finance management, ensuring openness and strengthening public trust in governmental institutions. In a world where information technologies are increasingly integrated into financial processes, transparency and accountability of the state cease to be merely ethical principles of public administration and are turning into a strategic imperative of sustainable development.

Digital tools in the field of public finance contribute to reducing administrative costs, improving budget planning, and enhancing the openness of data on the use of public funds. They create conditions for effective monitoring of budgetary processes



and increase the accountability of public authorities. In Ukraine, the digitalization of finance has become a key element in the modernization of the public sector, ensuring transparency and control over budgetary resources.

At the same time, the process of digital transformation in public finance faces a number of challenges, including insufficient integration of information systems, uneven digital capacities among public authorities at different levels, cybersecurity threats, imperfect legal and regulatory frameworks, and low levels of financial and digital literacy among users. These factors reduce the potential of digitalization as a mechanism for ensuring government transparency and accountability, which underscores the need to identify balanced managerial, technological, and legal solutions.

The relevance of the topic lies in the need for a comprehensive scientific understanding of the processes of digitalization of public finance as a key factor in shaping an open, transparent, and accountable system of public administration. Equally important is the identification of structural and technological barriers that limit the potential of digital transformation and the development of proposals to improve the effectiveness of implementing digital tools in the budgetary and financial spheres. The purpose of this article is to substantiate the role of public finance digitalization in ensuring state transparency and accountability, and to define the institutional foundations, technological mechanisms, and strategic priorities for the development of digital financial ecosystems.

Main text.

The digitalization of public finance is a multidimensional process that integrates technological, institutional, and socio-economic aspects of managing state resources. The theoretical and methodological foundation of digitalization is grounded in the synthesis of concepts such as e-government, new public management, open finance, the digital economy, and smart governance. This synthesis implies a transition from traditional administrative and bureaucratic forms of public finance management toward integrated, transparent, and data-driven models, in which information technologies serve as a fundamental resource for enhancing the effectiveness of fiscal policy.



Digitalization is understood as the process of transforming financial operations, reporting, analytics, and managerial decision-making into digital formats through the use of technologies such as big data, blockchain, artificial intelligence, and cloud services [4,5]. The theoretical underpinning of this process lies in the informational governance paradigm, which is based on the recognition of data as a strategic state asset capable of generating added value by improving the planning, forecasting, and control of financial flows.

In the research literature [1,2,3], several approaches have been developed to define the essence of public finance digitalization. The first is the technological approach, which focuses on the implementation of digital instruments such as platforms, electronic registries, and automated reporting systems. The second is the institutional approach, which views digitalization as the transformation of governance structures, the legal framework, and the organizational culture of the public sector. The third is the value-based approach, which interprets digitalization as a means of strengthening trust, transparency, accountability, and citizen participation in the budget process. The synthesis of these approaches constitutes the contemporary methodological foundation for analyzing digital transformations in the financial sphere.

The digitalization of public finance is grounded in the principles of rationalizing public expenditures, reducing transaction costs, optimizing fiscal control, and ensuring financial stability through enhanced informational transparency [6]. In this context, digital technologies serve as instruments for harmonizing the interests of the state, citizens, and businesses by creating mechanisms of mutual accountability.

According to the public management perspective, digitalization contributes to the democratization of public finance governance by ensuring open access to information and engaging citizens in financial decision-making. The concept of “open government” presupposes that public data on budgets, taxes, expenditures, and debt policy should be not only accessible but also suitable for analytical processing, thereby reinforcing governmental accountability and minimizing the risks of misuse.

The methodological framework for researching the digitalization of public



finance includes the application of systemic, process-based, and institutional approaches, as well as the principles of digital governance. The systemic approach allows the financial system to be viewed as an integrated set of interrelated elements, where digital platforms function as channels for information transmission and managerial coordination. The process-based approach focuses on optimizing the sequence of budgetary operations – from planning to reporting – through automation and data standardization. The institutional approach, in turn, emphasizes the role of legal and regulatory frameworks, governance structures, and organizational capacity in the implementation of digital solutions.

The digitalization of public finance is closely linked to the concept of financial openness, which reflects the degree of accessibility of information about the state, structure, and dynamics of public finances for all stakeholders. It also correlates with the concept of public accountability, which encompasses not only reporting on the use of budgetary funds but also the mechanisms for assessing the effectiveness of governmental decisions. In this sense, digitalization is not an end in itself but rather an instrument for strengthening financial democracy based on data transparency and public oversight.

International practice confirms that the implementation of digital technologies in public finance leads to an increase in the budget transparency index, greater efficiency of public expenditures, and a reduction in corruption risks [7]. Methodologically, these changes can be explained by the reduction of informational asymmetry, as digitalization ensures symmetric access to data for all participants in financial relations. Thus, the theoretical and methodological foundations of public finance digitalization form a new paradigm of governance that combines economic efficiency, transparency, and social trust. This paradigm transforms the perception of public finance from a closed system of state control into an open, interactive network of interaction among the state, business, and civil society. In this context, digitalization emerges as a key factor in shaping a new financial architecture of the state – one oriented toward performance, accountability, and sustainable development.

The institutional and technological architecture of digital public finance



represents a multi-level system that integrates legal, organizational, managerial, and technological components within the processes of planning, execution, monitoring, and control of budgetary resources. Its formation is based on the synergy among governmental institutions, financial organizations, IT companies, and civil society, which collectively create the infrastructure of open finance.

A key institutional role in this system is played by public financial management authorities – primarily the Ministry of Finance of Ukraine, the State Treasury Service, the Accounting Chamber, the State Audit Service, and local financial bodies. These institutions act as data operators, administrators of budgetary information systems, and coordinators of digital transformation processes. Institutional interaction among them is grounded in the standards of electronic document management, unified data exchange protocols, and mechanisms for verifying financial transactions.

From a technological standpoint, the architecture of digital public finance relies on a platform-based model of governance, the core elements of which include state information systems, open databases, analytical services, and digital communication channels. One of the fundamental components is the Unified Web Portal for the Use of Public Funds – eData – which integrates such subsystems as Spending.gov.ua, E-Data API, and the Unified Open Budget System. These tools ensure public access to information on expenditures of budgetary administrators, supplier contracts, payment dynamics, and audit results.

An essential element of the digital architecture is the Prozorro platform, which has transformed the public procurement sphere by creating conditions for competitiveness, transparency, and the minimization of corruption risks. The mechanism of open electronic auctions, standardized data, and public accessibility of all procurement stages exemplify the effective implementation of the principle “everyone sees everything”. In 2023, the Prozorro Market system was integrated with other state registries, ensuring the automatic updating of data on participants and contracts, thereby enhancing the level of trust in the state’s financial decisions.

An equally important component is the E-Reports electronic reporting system, which facilitates the automation of financial report submissions by budgetary



institutions, the unification of data formats, and the reduction of administrative burdens on users. Digital integration among E-Reports, eData, and the State Treasury Service ensures the continuity of financial control and enables real-time analytical monitoring of expenditures.

The development of a modern digital infrastructure for public finance also involves the creation of analytical and forecasting modules that utilize technologies such as big data, data mining, artificial intelligence, and blockchain. Within these systems, a transition occurs from the simple publication of data to the intelligent analysis of financial information, enabling the identification of inefficient or suspicious transactions, the evaluation of budget program performance, and the forecasting of fiscal risks. According to OECD data [2], such systems have already been successfully implemented in EU countries to establish integrated financial oversight mechanisms.

Institutionally, an essential direction of digitalization involves the development of public oversight mechanisms supported by open data, interactive dashboards, public taxpayer portals, and electronic information request services. Public platforms allow citizens not only to observe budgetary processes but also to participate in setting funding priorities through participatory budgeting instruments. This aligns with contemporary models of digital democracy, which combine transparency with accountability.

The institutional architecture of digital finance also requires a robust legal and regulatory framework that governs standards of openness, data access, information protection, and accountability for its use. In Ukraine, the formation of such a legal environment is taking place through the implementation of the provisions of the Law of Ukraine “On the Openness of the Use of Public Funds”, the Regulation on Data Sets Subject to Publication as Open Data, the Strategy for Digital Development, Digital Transformation, and Digitalization of the Public Financial Management System until 2030, and the Concept for the Development of E-Governance. At the international level, the Principles of Public Financial Transparency and Accountability and the Digital Government Principles remain the fundamental benchmarks.

Thus, the institutional and technological architecture of digital public finance



constitutes a system of interrelated elements in which government institutions establish the rules of engagement, technological platforms ensure data processing and openness, and society performs the function of oversight. Its effectiveness is determined not only by the level of technological sophistication but also by the capacity to build trust, align interests, and cultivate a new culture of financial accountability.

The further development of such an architecture will serve as the foundation for the transition toward intelligent public finance management systems that combine process automation, analytical depth, and civic transparency. Based on this premise, digitalization emerges not merely as a tool of automation but as a catalyst for transforming the interaction between the state and society – where data evolve into a mechanism of accountability and anti-corruption control.

An important factor in enhancing transparency is the public disclosure of financial data in digital format. Platforms such as E-Data, Spending.gov.ua, and Open-Budget enable citizens and analytical centers to monitor budget expenditures, the implementation of state programs, and public procurement processes in real time. The World Bank notes [1] that the availability of open data reduces information asymmetry, which has traditionally created a favorable environment for corruption risks.

In the context of accountability, digitalization ensures prompt and standardized reporting by budget funds administrators. Electronic reporting systems such as E-Reports and integrated treasury analytical modules not only automate the process of report submission but also generate analytical dashboards for monitoring the effectiveness of budget programs. The OECD emphasizes [2] that such digital solutions transform state control from formal reporting into continuous real-time monitoring, which significantly enhances the quality of managerial decisions and reduces the risks of misuse.

One of the most prominent manifestations of the digitalization effect can be observed in the sphere of public procurement, where the integration of Prozorro with other governmental systems ensures full transparency throughout the entire chain of contractual relations. Public access to data on participants, contract prices, implementation deadlines, and appeal procedures enables citizens and businesses to



exercise oversight and influence compliance with the principles of legality and efficiency in the use of budgetary funds. Research findings indicate that digital platforms have increased business trust in government procedures, reduced the number of disputes and court cases in the procurement sphere, and shortened the average duration of tenders [8].

An equally important dimension of enhancing transparency is the analytical processing of big data, which makes it possible to detect risky transactions, expenditure anomalies, and trends in the implementation of budget programs. Intelligent analytical systems integrated with digital platforms allow for the assessment of funding efficiency across various parameters, such as cost per output unit, timeliness of task completion, and alignment with strategic objectives. This facilitates not only a timely response to emerging issues but also the forecasting of potential fiscal risks, thereby strengthening the resilience of the financial system and the effectiveness of public policies.

Digitalization also strengthens public oversight and participation in the budget process through interactive services and participatory budgeting tools. Open data platforms enable citizens to evaluate funding priorities, monitor program implementation, and propose measures to enhance the performance of government initiatives. This aligns with the concept of digital democracy, where technology fosters not only transparency but also direct public engagement in shaping public finance.

At the same time, the impact of digitalization depends on the compatibility of technological solutions, the regulatory environment, and user capacity. Deficiencies in legislative regulation, low digital literacy among public officials and citizens, as well as cybersecurity threats, may constrain the potential of digital platforms. From this perspective, digitalization represents a systemic factor that requires a comprehensive approach – combining technology, institutional reforms, and capacity-building for users. Thus, the digitalization of public finance serves as a key driver for enhancing governmental transparency and accountability, as it ensures:

- open access to financial data in real time;
- standardized and automated reporting by fund administrators;
- analytical control and forecasting of fiscal risks;



- citizen participation in budgetary processes and the strengthening of trust in state institutions.

An effective combination of technological tools, regulatory frameworks, and the institutional capacity of public authorities creates the foundation for a transparent, accountable, and results-oriented system of public finance that aligns with international standards and modern practices of public resource management. Digitalization constitutes a powerful factor in promoting state transparency and accountability; however, the effectiveness of these transformations is constrained by a number of technological, organizational, regulatory, and social factors that generate potential risks for the functioning of the public finance system. While digital platforms ensure openness and accessibility of data, their imperfect implementation may lead to information asymmetry, increase vulnerability to cybersecurity threats, and undermine public trust in state institutions. One of the key challenges lies in the technological incompatibility of systems. In Ukraine, as in other countries undergoing an active process of digitalization, governmental information systems across various institutions are often developed in a fragmented manner, lacking unified data exchange standards and integration protocols. This results in information duplication, delays in data updates, and limited analytical capacity. International experience [2] demonstrates that successful financial digitalization requires a coherent architecture and interoperability among subsystems, ensuring continuity of the budget process and the accuracy of financial data. The second significant challenge relates to cybersecurity and the protection of personal and financial data. Public finance information platforms are potential targets for cyberattacks, which may lead to manipulation of budgetary data, leakage of confidential information, or disruptions in the execution of financial operations. States that underinvest in cybersecurity face risks of losing trust from citizens and businesses, undermining the effectiveness of transparency and accountability [3]. Financial risks associated with digitalization also manifest in the incorrect or incomplete processing of data, which can affect budget planning, the fulfillment of financial obligations, and the assessment of program effectiveness. The use of big data and analytical algorithms requires continuous data quality control,



transparent processing methodologies, and audits; otherwise, the risk of making erroneous managerial decisions increases.

To address these challenges, international practice recommends a comprehensive approach that includes [1,2,7]:

- the development of a coherent institutional and technological architecture for digital finance;
- the enhancement of regulatory frameworks and the implementation of e-government standards;
- investments in cybersecurity and data protection;
- the improvement of digital literacy among public officials and users;
- the implementation of systems for analytical monitoring and automated data quality control;
- the creation of public oversight mechanisms and the integration of participatory budgeting.

In Ukraine, these measures are already being implemented within the framework of the Strategy for the Digital Transformation of Public Finance until 2030, including the integration of platforms such as E-Data, Prozorro, E-Reports, and others. However, the effectiveness of implementation depends on coordination among government bodies, continuous technological updates, and staff training, which together ensure the sustainable development of a transparent and accountable public finance system. Thus, while the digitalization of public finance offers significant advantages in terms of transparency and accountability, it is accompanied by a range of technological, organizational, regulatory, and social risks that require systematic management. Addressing these challenges is crucial for establishing an effective, secure digital financial ecosystem capable of ensuring the stability of public finances and enhancing the efficiency of managerial decision-making.

Conclusions.

The digitalization of public finance serves as a key factor in enhancing governmental transparency and accountability, as it transforms traditional financial processes into open, interactive, and analytically supported systems for managing



public resources. Through the implementation of digital platforms such as eData, E-Reports, and Prozorro, citizens, businesses, and analytical centers gain real-time access to information on expenditures, the execution of budget programs, and public procurement, thereby reducing information asymmetry and fostering trust in state institutions. At the same time, the effectiveness of digitalization depends on a comprehensive integration of technology, institutional capacity, and the regulatory environment. Fragmented systems, low interoperability among subsystems, cybersecurity threats, data quality issues, and limited digital literacy among users can diminish the impact of these transformations. Public disclosure of financial data, automated and standardized reporting, integration of analytical modules for monitoring and risk forecasting, and the development of public oversight mechanisms collectively create conditions for more efficient and transparent use of budgetary resources. Digitalization of finance thus emerges not merely as a technical process of automation but as a strategic factor in shaping an intelligent and transparent financial system, in which technologies, data, and institutions interact to enhance state accountability, ensure the stability of budgetary processes, and strengthen public trust. In the long term, the development of a digital financial ecosystem is expected to facilitate the implementation of innovative management tools, improve the efficiency of financial policy, and foster a culture of open and accountable public finance.

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Анотація. Стаття присвячена дослідженню цифровізації публічних фінансів як ключового чинника підвищення прозорості та підзвітності держави. Проаналізовано теоретико-методологічні основи цифрової трансформації бюджетного процесу, визначено інституційно-технологічну архітектуру цифрових фінансів, що включає державні інформаційні системи, відкриті бази даних та аналітичні платформи. Розглянуто практичні ефекти цифровізації, зокрема підвищення доступності фінансових даних, стандартизоване звітування, аналітичний контроль і громадську участь у бюджетному процесі. Виявлено проблеми та ризики впровадження цифрових платформ, серед яких фрагментарність систем, кіберзагрози, нормативні обмеження та низька цифрова грамотність користувачів. Запропоновано рекомендації щодо вдосконалення цифрової інфраструктури, нормативного середовища, кіберзахисту, аналітичного моніторингу та громадського контролю. Отримані результати свідчать, що цифровізація публічних фінансів сприяє формуванню прозорої, підзвітної та ефективної системи управління державними ресурсами, підвищує довіру суспільства та забезпечує стратегічну стійкість державних фінансів.

Ключові слова: цифровізація, публічні фінанси, прозорість державних фінансів, підзвітність органів влади, електронне урядування, відкриті дані, аналітика публічних фінансів, громадський контроль, електронне бюджетування.